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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/826,837	04/16/2004	Eugene Boden	148466-1	1735

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GENERAL ELECTRIC COMPANY
GLOBAL RESEARCH
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EXAMINER	
ANGEBRANNDT, MARTIN J	

ART UNIT	PAPER NUMBER
1756	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/826,837	BODEN ET AL.	
	Examiner	Art Unit	
	Martin J. Angebranndt	1756	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10/11/05 & 4/16/04*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-25* is/are pending in the application.

4a) Of the above claim(s) *11-25* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☒ Claim(s) *1-25* are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *10/11/05 & 4/16/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 1-10, drawn to a photocurable composition, classified in class 430, subclass 280.1.

II. Claims 11-17, drawn to a method for forming a holographic recording medium including forming the photocurable composition into a substrate and writing data in the cured substrate, classified in class 430, subclass 321.

III. Claims 18-25, drawn to a methods of recording holograms, classified in class 430, subclass 1.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions group I and group II are related as product and process of use. The inventions can be shown to be distinct if either or both of the following can be shown: (1) the process for using the product as claimed can be practiced with another materially different product or (2) the product as claimed can be used in a materially different process of using that product. See MPEP § 806.05(h). In the instant case the photocurable composition can be flood/entirely cured and then used as a dye in polymer recording media, after the photocuring is over. In this case the polymerization is not data, but the later exposure is.

3. Inventions group I and group III are related as product and process of use. The inventions can be shown to be distinct if either or both of the following can be shown: (1) the process for using the product as claimed can be practiced with another materially different product or (2) the product as claimed can be used in a materially different process of using that product. See MPEP § 806.05(h). In the instant case the photocurable composition can be

flood/entirely cured and then used as a dye in polymer recording media, after the photocuring is over. In this case the polymerization is not data, but the later exposure is.

4. Inventions group II and group III are related.

5. Because these inventions are independent or distinct for the reasons given above and there would be a serious burden on the examiner if restriction is not required because the inventions have acquired a separate status in the art due to their recognized divergent subject matter, restriction for examination purposes as indicated is proper.

6. During a telephone conversation with Shawn McClintic (45,856) on June 8, 2007 a provisional election was made without traverse to prosecute the invention of group I, claims 1-10. Affirmation of this election must be made by applicant in replying to this Office action. Claims 11-25 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

7. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an

> international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. Claims 1-3,5-8 and 10 are rejected under 35 U.S.C. 102(b) as being fully anticipated by Cumpston et al. '931.

A composition including a cumyltolyliodonium tetrakis (pentafluorophenyl)borate photoacid initiator, a naphthacene sensitizer, an mixture of PC-1000/PC-1004 monomer and Dow Corning 705 (polysiloxane) binder to which is added tolylphenylaminobiphenyl or 4,4'bisN,N-dimethylamino biphenyl or 4,4'-bisN,N dimethylamino stilbene (7/11-61). This is placed between two glass plates and procured and then a format grating formed therein. (7/62-8/40). The use of a laser to later alter the hologram is disclosed throughout (abstract and 14/30-57). The use of various photoacid generators is disclosed (6/14-38).

11. Claims 1-3,5-7 and 10 are rejected under 35 U.S.C. 102(b) as being fully anticipated by JP 06-298912 (machine translation attached).

Example 1 uses polyvinyl carbazole, ERL 4221 (epoxy) as the monomer, triphenylsulfonium salts and a ketocoumarin.[0011]. Example 5 is similar but uses polyvinyl alcohol as a binder [0016]. The coloring matter can be indigo, a ferrocene, an azo, a quinone or the like [0008]. Useful binders are disclosed including polystyrene, acrylic resins, polycarbonate,

polyacrylonitrile, polyvinyl carbazole, polyvinyl alcohol, polyvinyl chloride, polyvinyl acetate, polyester, or the like [0009].

12. Claims 1,2,5-7 and 10 are rejected under 35 U.S.C. 102(b) as being fully anticipated by JP 04-062554.

JP 04-062554 teaches in example 1, a diazo pigment, a PMMA resin, a vinyl ether monomer, diphenyliodonium hexafluoroarsenate and diethylthioxanthone to form a resin. (see abstract for translation)

13. Claims 1,2,5-7 and 10 are rejected under 35 U.S.C. 102(b) as being fully anticipated by JP 04-181944.

Example 1 teaches polyvinylcarbazole, and acrylate, an epoxy monomer, a porphyrin, and an iodonium salt (page 4/lower left column)

14. Claims 1-3,5-7 and 10 are rejected under 35 U.S.C. 102(b) as being fully anticipated by JP 02-173729.

Example 1 teaches benzylmethacrylate/methacrylic acid polymer, penta erythritol tetraacrylate, a trazine and p-nitroaniline (page 3/lower right column) to form a second harmonic generation element. The exposure uses near UV light.

15. Claims 1-3 and 5-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 02-173729, in view of Dhar et al. '541.

Dhar et al. '541 teach acrylate based photopolymerizable compositions where the free radical is bis(eta-5,2,4-cyclopentadien-1-yl)bis(2,6-difluoro-3-(1H-pyrrol-1-yl)phenyl)titanium (CGI-784) or 5,7-diiodo-3-butoxy-6-fluorone (HNU-470 coupled with eosin (7/51-8/14).

It would have been obvious to modify the composition of JP 02-173729 by using other known photoinitiators for free radical polymerization, such as bis(eta-5,2,4-cyclopentadien-1-yl)bis(2,6-difluoro-3-(1H-pyrrol-1-yl)phenyl)titanium (CGI-784) or 5,7-diiodo-3-butoxy-6-fluorone (HNU-470 coupled with eosin with a reasonable expectation of forming a composition useful in forming a second harmonic generation element.

16. Claims 1-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 02-173729, in view of Carre et al. "New materials for intergrated optics based upon functionalized photopolymers", Proc. SPIE. Vol. 4924 pp. 106-113 (2002).

Carre et al. "New materials for intergrated optics based upon functionalized photopolymers", Proc. SPIE. Vol. 4924 pp. 106-113 (2002) teaches a photocurable composition comprising an acrylic monomer, bis(eta-5,2,4-cyclopentadien-1-yl)bis(2,6-difluoro-3-(1H-pyrrol-1-yl)phenyl)titanium (CGI-784, photoinitator) and a chromophore AcEONS able to be covalently bound to the resulting polymer. This results in a more stable chromophore alignment/orientation as evidenced by table 2 (page 112).

It would have been obvious to modify the composition of JP 02-173729 by using other known photoinitiators for free radical polymerization, such as bis(eta-5,2,4-cyclopentadien-1-yl)bis(2,6-difluoro-3-(1H-pyrrol-1-yl)phenyl)titanium (CGI-784) and/or a photosensitive NLO chromophore with a reasonable expectation of forming a composition useful in forming a second harmonic generation element. In the case of the photocurable chromophore the resulting orientation of the chromophore is more stable than one merely dispersed in the polymer.

17. Claims 1-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 02-173729, in view of Carre et al. "New materials for intergrated optics based upon functionalized

photopolymers", Proc. SPIE. Vol. 4924 pp. 106-113 (2002), further in view of Beecher et al. 'Concurrent stabilization and imaging of a novel polymer for second harmonic generation via in situ photopolymerization', J. Am., Chem. Soc., Vol. 115 pp. 12216-12217 (1993).

Beecher et al. 'Concurrent stabilization and imaging of a novel polymer for second harmonic generation via in situ photopolymerization', J. Am., Chem. Soc., Vol. 115 pp. 12216-12217 (1993) teaches an NLO chromophore bound to a polymer backbone which also includes a photocurable moiety which can be crosslinked by as bis(eta-5,2,4-cyclopentadien-1-yl)bis(2,6-difluoro-3-(1H-pyrrol-1-yl)phenyl)titanium (CGI-784). The orientation of doped chromophore is disclosed as poor as they are able to relax. This can be reduced by thermal or photocrosslinking of the polymer. The increased stability of due to the use of the polymer bound NLO chromophore is illustrated in figure 2, with the photocured sample having the highest stability.

To address the embodiments bounded by the claims where the (NLO) chromophore is bound to the polymer. The examiner has cited Beecher et al. 'Concurrent stabilization and imaging of a novel polymer for second harmonic generation via in situ photopolymerization', J. Am., Chem. Soc., Vol. 115 pp. 12216-12217 (1993) who teach the increased stability of the orientation when both ends of the chromophore are bound in the fully cured composition, rather than just one end and holds that this provides motivation for binding the NLO chromophore to the polymer in the invention resulting form the combination of JP 02-173729 and Carre et al. "New materials for intergrated optics based upon functionalized photopolymers", Proc. SPIE. Vol. 4924 pp. 106-113 (2002).

18. Claims 1-3,5-7 and 10 are rejected under 35 U.S.C. 102(b) as being fully anticipated by Imahashi et al. '056.

See examples 15-21 which include a binder, tetyraethylene glycol diacrylate as the monomer, a cyclopentadienyl iron photoinitiator and a quinoline sensitizer (and the stable dye).

19. Claims 1-5 and 7 are rejected under 35 U.S.C. 102(b) as being fully anticipated by Boogers et al., 'Crosslinked polymer materials for nonlinear optics. ....', Macromolecules Vol. 27(1) pp. 197-204 (1994).

Boogers et al., 'Crosslinked polymer materials for nonlinear optics. ....', Macromolecules Vol. 27(1) pp. 197-204 (1994) teaches a composition using a crosslinkable NLO monomer (monomer 1) mixed with photomer 3016 (binder) with Irgacure 907 used as the photoinitiator (page 200/lowere left to right column). In this case the monomer and the stable dye are together in a single compound. The claims do not preclude this embodiment.

20. Claims 1-3,7 and 10 are rejected under 35 U.S.C. 102(b) as being fully anticipated by Ohe et al. '345.

See example 1. The sensitizing dye is considered the stable dye.

21. Claims 1-3 and 7 are rejected under 35 U.S.C. 102(e) as being fully anticipated by Cumpston et al. '984

See example 8, which uses the NLO chromophore as the photoinitiator. (page 16)

22. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

JP 03-213831 teaches the use of polymer bound NLO chromophores in photocurable compositions.

Savant et al. '221 teach azo dye based recording materials.

JP 11-116611 (machine translation attached) teaches photocurable composition with multiple dyes.

Devoe et al. '766 see example 14.

JP 61-076521 or JP 61-192724 teache photocurable compositions.

23. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Martin J. Angebranndt whose telephone number is 571-272-1378. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on 571-272-1385. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Martin J Angebranndt
Primary Examiner
Art Unit 1756

06/14/2007